dean of the School of Applied Science; Associate Professor J. E. Latta, professor of electrical engineering; Professor A. H. Patterson, formerly of the University of Georgia, professor of physics; Associate Professor W. C. Coker to be professor of botany; Associate Professor Archibald Henderson to be professor of pure mathematics; instructors in mathematics, G. K. G. Henry and J. C. Hines, Jr.; instructor in physics, T. J. McManis. The university has just completed at the cost of $35,000, a new laboratory for the department of biology.

RECENT appointments at the University of Kansas are as follows: L. D. Havenhill, professor of pharmacy; assistant professors, G. W. Hartwell in mathematics, Burton McCullum in physics, H. C. Allen in chemistry, and A. H. Sluss in mechanical engineering; instructors Paul Wernicke, Mayer Gaba, C. A. Pierce in mathematics; F. U. G. Agrelius in botany; R. L. Moodie in zoology; Cecil Smith in physiology, and C. H. Wittington museum assistant in entomology.

THE following appointments have been made at Lehigh University: Instructors, R. G. Fogg, B.S., in civil engineering; H. E. Hendricks, B.S., in civil engineering; H. A. S. Howarth, Ph.B., in mechanical engineering; F. T. Leilich, E.E., in physics; Edgar T. Wherry B.S., and Chester G. Gilbert, Ph.B., in mineralogy; Assistants: Walter K. Van Haagen, B.S., in chemistry; Edwin E. Reinke, B.A., in biology.

DR. S. N. TAYLOR, of Pittsburg University, has been appointed professor of electrical engineering at the University of Cincinnati.

WASHBURN COLLEGE, Topeka, Kans., has established this year a department of botany and zoology with Dr. C. H. Edmondson, of the University of Iowa, in charge of zoology and Dr. Ira D. Cardiff, University of Utah, in charge of botany.

MR. A. B. FRIZELL has been appointed professor of mathematics at Midland College, Atchison, Kansas.

IN Manchester University, Mr. J. E. Petavel, D.Sc., F.R.S., lecturer in mechanics and in meteorology and demonstrator in physics, has been appointed professor of engineering; Mr. C. H. Lander, lecturer in engineering; Mr. T. G. B. Osborn, lecturer in economic botany; Mr. F. H. J. A. Lamb, M.D., now demonstrator in physiology, Cardiff University College, senior demonstrator in physiology; Mr. A. E. Woodall, junior demonstrator in physiology; Mr. T. W. Todd, senior demonstrator, and Mr. E. E. Hughes, and Mr. S. H. J. Kilroe, junior demonstrators in anatomy.

DR. HEINRICH BURKHARDT, professor of mathematics at Zurich, has been called to the Technical Institute at Munich.

DISCUSSION AND CORRESPONDENCE

THE TEACHING OF MATHEMATICS TO STUDENTS OF ENGINEERING

TO THE EDITOR OF SCIENCE: The observations of Professor George F. Swain, of The Massachusetts Institute of Technology, in the issue of August 28, on "The Teaching of Mathematics to Students of Engineering," are as valuable and suggestive as they are frank and progressive. They stand out clearly as the practical judgment of one in close touch with the needs of engineering. While these observations touch primarily the field of mathematics, and applied mathematics, and while we are compelled to let each specialty speak for itself; yet the same ideas, of using school training as a tool for practical use, and the necessity of developing the practical imagination, these ideas are quite as essential in other fields of natural science. As a teacher of chemistry, and one specially interested in the newer industrial and trades-school movement, I wish to emphasize the value of Professor Swain's remarks for chemistry in particular, and, presumably, for most of the other sciences in general. The contrast of view between the remarks of Professor Schlichter and Professor Swain is obviously that between the traditional teacher and the progressive engineer. The one looks at science from the standpoint of the teacher of theory; the other, from that of the user of school training. And in this difference, as clearly shown by Pro-

fessor Swain, is the new suggestion which is probably destined to be the basis of all industrial training. In a word, it is the pedagogical idea that the practical man learns by using. The question, "What is it good for?" has often been feared and avoided as the badge of cheap superficiality, on the one hand; and, on the other hand, as a serious menace to sound and honest research. But are we not now in a position where we may safely trust the well-trained teacher to use the actual need, and to employ the use of a science, as guides in teaching and learning that science? The immense advantage to be gained, for many students, by the combined assistance of the eye and the hand suggests that it may be best to start with actual tests and problems. This will place the student squarely face to face with facts and needs. This will also quicken the interest of the student; and it may prove to be the perpetual provider of a keen interest, that subtle psychological stimulus which spurs every good worker to success. Once given this start, and with the well-trained teacher, the student is naturally led to the helpful guidance of books and theory. Necessity is still the mother of progress; and we need not fear the sad augury implied in Professor Schlichter's remarks on teaching "dyeing and not chemistry." The student need not be "out of date," either at the start or later, if he is naturally led to the books and literature on his special field. Moreover, the student who starts with the practical, is always in touch with the actual needs of his craft—something which is often a sealed book to the theorist. It is not to be denied that this reversal of the application of theory to fact and need has its difficulties and dangers; so do all systems of education. But it looks like the solution of the technical and industrial education problem. It is to be hoped that this idea will not be allowed to slip from the attention of educators—the idea of using the fact, the problem, the need, the experiment—as the natural starting point for education, for teaching theory, and to catch the interest of the student. It bears three marks of genuineness, namely: It meets the practical needs; it catches the interest of the student; and it exemplifies the inductive method of learning through use.

Charles S. Palmer

23 Park Place,
Newtonville, Mass.,
August 29, 1908

Hummingbird and Hornet

Early in the summer of 1907 a dish of sweetened water was placed on the railing of the veranda of a cottage in North Acton, Mass. The next morning a female hummingbird was seen hovering over it. In a few days she became so accustomed to the presence of the family that she would feed from the vessel while a number of persons were sitting only a few feet away.

This year (1908) the cottage was first occupied on June 2. The next morning a pair of hummers were seen hovering over the railing where the sweetened water had been placed the year before. A saucer of water containing a few lumps of sugar was immediately provided for them.

They helped themselves frequently from this for several days, when the male disappeared. The female has continued her visits to the saucer many times each day up to the present time (August 24).

On July 22, while sitting within five feet of the vessel, I noticed, for the first time, a bald-faced hornet (*Vespa maculata*) inside the saucer. As I watched its motions, the hummingbird appeared, hovering over its accustomed feeding place. Instantly the hornet darted at it, and the hummer fled, closely pursued by the insect. The spectacle exactly resembled, on a small scale, the driving of a hawk or crow by a kingbird. In a minute or two the hornet was back exploring the contents of the saucer.

Presently the hummer returned, poised itself over the tempting dish, long enough to see that its enemy was on the ground, when it fled precipitately. She still (August 24) continues to come many times each day, only attempting to feed when the field is clear of hornets.

Charles W. Mead
American Museum of Natural History